holding two or three litres is employed and into this a considerable quantity of *Cabomba Caroliniana* or *Myriophyllum spicatum* is introduced (fig. 2). The water is thoroughly charged with carbon dioxide and the plants are then exposed to the sunlight. Little streams of gas are seen to pass upward from various points, and when sufficient gas has collected at the top of the flask, the latter is immersed in a tank of water in a horizontal position in such a manner that the gas is directly under the opening (fig. 3). On turning the stop-cock and applying a splinter of wood with a spark on the end of it the gas will be found to be oxygen.

When the supply of carbon dioxide in the water has been exhausted the plant will no longer give off bubbles of oxygen. The process may be again initiated by passing carbon dioxide into the receiver. Before testing it is best to allow the carbon dioxide to become exhausted, since in recharging the water it is impossible to avoid collecting some of this gas over the liquid and adulterating the oxygen. On standing it is gradually absorbed by the water and consumed by the plant. In any case the gas collected is not pure oxygen, but it is sufficiently rich in this substance to make an effective demonstration.

The deaths of D. Shepherd Holman, a member, May 13, and of Thomas C. Porter, a correspondent, April 27, were announced.

MAY 21.

Mr. CHARLES MORRIS in the Chair.

Seventeen persons present.

Papers under the following titles were presented for publication:

"Fishes from the Caroline Islands," by Henry W. Fowler.

"Types of Fishes," by Henry W. Fowler.

Structure of Diatoms.—MR. FRANK J. KEELEY remarked that in studying the structure of diatom valves some years ago the method employed: mounting broken valves at right angles to the cover glass, proved efficient for most of the coarsely marked forms, but failed with certain species of *Aulacodiscus.*

Such forms as *A. Sollittianus, A. margarataceous,* etc., yielded satisfactory sectional views and proved not to differ materially in structure from *Coscinodiscus;* but another group, including *A. Oreganus, A. Rogersii, A. Janischii,* etc., proved too opaque for the elucidation of their structure by this method. Further exam-

ination of fragments in which the plates were separated indicated, however, that the typical "honeycomb" cellular structure was likewise present in these species, but masked by the unusual character of the external plate, which differs from that of other diatoms in having the finer secondary structure between, rather than over, the large cells of the middle plate.

Recently, with the view of further determining the relations of this structure to that of other species, a special mount was prepared, including *A. Oreganus*, *A. Rogersii*, with typical species of *Coscinodiscus*, *Triceratium*, *Actinocyclus*, *Actinoptychus*, etc. The various forms were arranged in a line on a square cover-glass, supported on the slide by bands of cement at two opposite edges, thus permitting fluids of varying refractive indices to be passed under the cover and withdrawn by the use of blotting paper in the manner familiarly known as "irrigation."

The fluids employed consisted of absolute alcohol, cedar oil, oil of cassia and mixtures of same, giving refractive indices from about 1.37 to over 1.60. Starting with the lowest refractive index, the appearance of each diatom was carefully noted under low, medium and high aperture objectives, and it was found that all the species represented, with the exception of the two *Aulacodiscii*, became fainter as the refractive index was increased up to about 1.435, when they were entirely invisible, except where in contact with the cover glass. As the index of the medium surrounding them was increased above this point they became more distinct, the coarser forms being almost opaque in oil of cassia. This is exactly what should have been expected, either on theoretical grounds or based on previously published experiments, but in the case of the two species of *Aulacodiscus* mentioned the distinctness of visibility under a low power seemed to increase from the start, and in the medium where other forms disappeared they were even more strongly outlined than in alcohol, while under an oil immersion-objective no difference could be noted in the sharpness and contrast with which the secondary structure was shown in any of the various fluids, although portions of the internal plates, which extended beyond the external plate in broken forms, were extinguished with the rest of the diatoms on the slide, showing that the anomalous behavior of these species was confined to the external plate, containing the secondary structure. Neither heating to redness on platinum foil nor boiling in strong acids has the least effect on the appearance of the secondary structure, nor is there anything to indicate that its appearance is due to difference in composition rather than of structure. With the facts at present available it would be useless to hazard a conjecture as to the true nature of this structure, but it may be safely affirmed that in the external plate of this group of species of *Aulacodiscus* we have a structure essentially different from that found among other diatoms.

Aulacodiscus Oreganus is one of the few diatoms that show bright colors with central transmitted light. The two valves of this species included on slide under observation, when examined with a three-fourths-inch objective of .25 N.A., were bronze-yellow when dry, yellowish gray in alcohol, bluish gray in medium of 1.41 R.I., iridescent blue in medium of 1.44 R.I., deep greenish blue in cedar oil, dark green and pink in oil of cassia.

The question of colors shown by diatoms in direct light has recently been treated in the *Journal of the Queckett Club*, with special reference to *Actinocyclus Ralfsii*, by E. M. Nelson, who has shown that the color cannot be due to diffraction. The two valves of *A. Ralfsii* which were included in the previously described slide showed only pale brown and grayish tints in media of R.I. below 1.50, and extinguished with the other forms in one of R.I. about 1.43. In cedar oil one valve showed a blue color and in oil of cassia both became brilliant with green, blue, purple and yellow. Under wide aperture objectives the color is not visible when diatom is sharply in focus, but appears as soon as thrown slightly out of focus. This color appears to be due to dispersion, and its nature and cause might possibly be further elucidated by studying the effect produced by different media such as were employed in this case.

MAY 28.

Mr. ARTHUR ERWIN BROWN, Vice-President, in the Chair.

Eighteen persons present.

Papers under the following titles were presented for publication:

"Contributions to the Life History of Plants, No. XV," by Thomas Meehan.

"Observations on the Placenta and Young of Dasypus sexcinctus," by Henry C. Chapman, M.D.

The death of Dr. D. B. McCartee, a correspondent, July 1, 1900, was announced.

Mr. Adolph Fredholm was elected a member.

The following were ordered to be printed: